

tion, and can be made more or less sensitive. It is impossible from a mere description to form any conception of the efficiency of the apparatus, nor has it been tried by any earthquake, but the instrument before you having been erected on the gable of a dwelling house during the past year, repeatedly registered the shaking of the gable to the amount of 1-16th of an inch.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The Museums and Lecture Rooms Syndicate have just issued their annual report, in which they mention the high value of the present of the late Prof. Balfour's scientific instruments and library to the University by his family, and again emphasise the necessity existing for a new chemical laboratory. Mr. Clark records the mounting of the fine male Indian elephant's skeleton in the Zoological Museum, received in an exceedingly complete state last year in consequence of its careful preparation by Mr. A. Haly of the Colombo Museum. The animal was shot by Mr. Le Mesurier of the Ceylon Civil Service; its height was nine feet. A specially interesting skeleton of the adult Gangetic Dolphin has been presented by Sir J. Fayrer. Mr. A. P. Maudslay, M.A., of Trinity Hall, has deposited in Mr. Clark's care a large portion of his ethnological collection made in Fiji and adjacent islands; these are almost certain to be presented to the University at no distant date. The Curator in Zoology (Mr. A. H. Cooke) has catalogued and arranged the British species in the MacAndrew collection. Its completeness may be judged by the facts that of 6 recorded species of Brachiopoda this contains 5; of 159 marine Conchifera this contains 146; of 248 marine Gasteropoda this contains 208; of 125 land and freshwater shells this contains 114. A recent appeal to add missing species has already resulted in the presentation of fourteen species by Mr. J. T. Marshall.

Dr. Michael Foster reports an average class of about 100 in Elementary Physiology, and of over 20 in advanced Physiology, in the three terms of the past year. Additional lecture room accommodation is much needed for these large classes.

The morphological work begun by the late Prof. Balfour has been continued on the same lines by Mr. Adam Sedgwick, Mr. W. H. Caldwell and Dr. Hans Gadow as lecturers, and Mr. Walter Heape and Mr. W. F. R. Weldon as demonstrators. In the Lent Term of this year 63 students attended the elementary class, and 26 the advanced classes. Five students have been engaged in original work. Mr. A. J. Balfour, M.P., has offered to give annually a sum sufficient to defray the cost of the complete series of scientific journals taken in by his late brother.

Dr. Vines has carried on practical instruction in Vegetable Anatomy and Physiology under considerable difficulties owing to the small space available; he has had to repeat all the work four times. The numbers attending his practical classes in the Michaelmas Term, 1882, were 19; in the Lent Term, 1883, 37; in the present Easter Term, 35.

Prof. Hughes reports that the whole of the geological library, consisting of 800 volumes and 1000 pamphlets, of the late Mr. E. B. Tawney, have been liberally presented to the Woodwardian Museum by his brother, Mr. C. H. Tawney, late Fellow of Trinity College. Opportunity has been taken in the past year to largely improve the foreign Tertiary collections in the museum.

Prof. Stuart reports the addition of a number of machines and a large development of his classes; a foundry begun as an experiment has proved one of the most successful parts of his undertaking.

The Philosophical Library in the new Museums has been largely increased by the valuable presents made by the family of the late Prof. Balfour, by Mr. J. W. Clark, by Prof. Darwin, Prof. Humphry, Prof. Newton, and others.

It has been recommended by the Special Board for History and Archaeology that a separate Board be created for Archaeology, distinct from that of History. This has been concurred in by the General Board of Studies.

The Botanic Garden Syndicate have reported many improvements in the collections of trees, of rock vegetation, and in the Plant Houses. The largest specimens in the Palm House have been safely lowered to about 2½ feet below the ground level. All the genera of carnivorous plants in cultivation and most of the species are now in the collection. *Vitis gongylodes* has been flowered for the first time in this country. The Curator, Mr. Lynch, was deputed to visit the Botanic Gardens at Dublin,

Manchester, and Liverpool, and has also visited Chatsworth with the result that much valuable information has been obtained in all departments of management and cultivation, and many important exchanges have been made.

The Adams Prize, for a general investigation of the action upon each other of two closed vortices in a perfect, incompressible fluid, has been awarded to Mr. J. J. Thomson, M.A., Fellow of Trinity College.

Messrs. W. H. Besant and E. J. Routh are the first to be notified as "approved by the general Board of Studies for the Degree of Doctor in Science."

Candidates for the Professorships of Physiology and Anatomy are requested to send their names to the Vice-Chancellor on or before June 7.

THE Institute of Agriculture, South Kensington, will give an extended series of lectures next winter, beginning on October 1. The following courses are arranged for:—Mr. Bernard Dyer, Chemistry in Relation to the Soil; Mr. F. Cheshire, Practical Course on the Use of the Microscope (these two courses to be delivered in the Lecture Theatre of the Museum of Geology, Jermyn Street). The next series will be given in the Lecture Room of the Natural History Museum, South Kensington: Mr. Bettany, Vegetable Physiology; Mr. Worthington Smith, Diseases of Farm Crops; Prof. J. W. Axe, Animal Physiology in Relation to Farm Stock; Miss E. A. Ormerod, Farm Insects; Mr. W. Topley, Geology and Physical Geography in Relation to Agriculture. The remaining courses will be given in the Lecture Theatre of the South Kensington Museum: Prof. Tuson, the Chemistry of the Food of Farm Stock; Prof. Buckman, Farm Seeds; Prof. Tanner, Agriculture; Mr. R. Holland, Management of Grass Land; Mr. Gilbert Murray, Breeding and Management of Horses; Mr. W. Housman, Cattle; Mr. H. Woods, and Mr. J. A. Clarke, Sheep; Prof. J. W. Axe, Preventable Diseases of Farm Stock; Farm Implements and Machinery, Mr. W. R. Bousfield and Mr. W. W. Beaumont. A distinct course of lectures will be given on Poultry, Dairy, and Bee Management. The arrangements made enable students to give their undivided attention to one subject at a time, two lectures being given daily till the subject is completed. The fees being at the rate of half a guinea for each week's course of ten lectures, and any student being allowed to attend a single course, the greatest facility exists for persons choosing their work according to their needs or convenience. Thus it is believed, after the success of the tentative courses of the past winter, that many sons of tenant farmers will find this a most valuable and available mode of acquiring an agricultural education.

SCIENTIFIC SERIALS

The American Naturalist for March, 1883, contains:—On the extinct dogs of North America, by E. D. Cope.—On the plains of Michigan, by V. M. Spalding.—Organic physics, by Charles Morris.—Indian music, by E. A. Barber.—On the occurrence of fossiliferous strata in the lower Ponent (Catskill) group of Middle Pennsylvania, by E. W. Claypole.—Pitcher plants, by Joseph F. James.

April, 1883, contains:—The Naturalist Brazilian Expedition, No. 1, from Rio de Janeiro to Porto Alegre, by H. S. Smith.—Unnatural attachments among animals, by J. D. Caton.—Butterfly hunting in the desert, by W. G. Wright.—The extinct Rodentia of North America, by E. D. Cope.—Heterogenetic development in Diaptomus, by C. L. Herrick.—A study of the immature plumage of the North American shrikes to show their descent from a common progenitor, by Thos. H. Streets.

May, 1883, contains:—Wampum and its history, by E. Ingesson.—The Naturalist Brazilian Expedition, No. 2, by H. S. Smith.—The Polar organisation of animals, by C. Morris.—On the classification of moths, by A. R. Grote.—Heterogenetic development of Diaptomus, by C. L. Herrick.—On the morphology of arteries, especially those of the limbs, by F. Baker.—The hairy woodpecker, by A. G. Van Aken.

Archives Italiennes de Biologie, tome ii. fasc. 2, November 30, 1882, contains among the original articles the following:—On the minute anatomy of the muscles which move the wings of insects, by G. V. Ciaccio.—On the structure of striated muscular fibre in some vertebrates.—On the development and the morphology of the kidney of osseous fish, by C. Emery.—On the substance preventing the coagulation of the blood and lymph whilst these contain peptone, by Jules Fano.—On the germs and lower

organisms found in ordinary and malarial earths, by A. Ceci.—Transfusion of blood and its effects on nutrition, by P. Albertoni.—On the pathological anatomy of the cornea in the glaucomatous eye, by F. Tartuferi.—On the presence of a cordon or slip on the Uncus of the Hippocampus in the brain of man and some other animals, by C. Giacomini.—On the chemical composition of the egg and its envelope in the common frog (*Rana temporaria*), by P. Giacosa.—Anatomical considerations of the doctrine of cerebral localisations, by C. Golgi.

Tome ii. fasc. 3, February 1, 1883, contains anatomical considerations of the doctrine of cerebral localisations, by C. Golgi (continued).—On compensative hypertrophy of the kidney, by C. Golgi.—Experimental studies on hypnotism, by A. Tamburini and G. Seppilli.—The origin of the mesoderm and its relations to the vitellus, by G. Romiti.—On the anatomy of a foetal Otaria (*O. jubata*), by L. Camerano.—On the physiology of smooth muscular tissue, by A. Capparelli.—On the physiological action of certain substances on the vesical muscles, by P. Pellacani.—On the anaemia of miners from a parasitological point of view, by E. Perroncito.—On the change in form of uric acid by the action of glycerine, by J. Colasanti.—On Ptomaines, by J. Guareschi and A. Mosso.—On some endoparasitic Protista, by Dr. Grassi.

Tome iii. fasc. i., April 15, 1883, contains:—On the sanitary improvement of the Roman Campagna, by C. Tommasi-Crudeli.—On the anaemia of miners (conclusion), by E. Perroncito.—On some endoparasitic Protista (conclusion), by Dr. Grassi.—On the presence of a secretive tissue in vertebrates, by C. Emery.—On vibratile endothelium in mammals, by J. Paladino.—On the attenuation of charbon virus, and on its transmission from mother to fetus, by E. Perroncito.—On the acoustic epithelium, by A. Tafani.—On the termination of nerves in the striated muscles of torpedo, by J. V. Ciaccio.—The general physiology of smooth muscular tissue, by E. Sertoli.—On a new morphological element of the blood, and its importance in thrombosis and coagulation, by J. Bizzozero.—New studies of the chestnut disease, known as the ink disease, by J. Gibelli.

THE *Bulletin de l'Academie Royale des Sciences, des Lettres, et des Beaux-Arts* for 1883, part i., contains papers by F. Henrjean, on the part played by alcohol in nutrition; by MM. Valerius and Van der Mensbrughe, on M. Delaurier's observations on the concentration of solar rays and the transformation of electricity into heat; by W. Spring, on the colour of marine, lacustrine, and fluvial waters; by C. Le Paige, on the homography of the third order in algebra; by Baron Northomb, on the political relations of the Netherlands during the seventeenth century.

SOCIETIES AND ACADEMIES LONDON

Royal Society, February 1.—“On the Affinities of Thylacoleo.” By Prof. Owen, C.B., F.R.S., &c.

Since the communication of the paper “On Thylacoleo,” in the *Philosophical Transactions* for 1871, further explorations of the caves and breccia-fissures in Wellington Valley, New South Wales, have been made, by a grant for that purpose from the Legislature of the Colony, and carried out by E. B. Ramsay, F.L.S., Curator of the Museum of Natural History, Sydney. The present paper treats of the fossils contributing to the further restoration of the great carnivorous Marsupial (*Thylacoleo carnifex*, Ow.) They exemplify the entire dentition *in situ* of the upper and lower jaws of a mature individual; the bones of the forelimb, of which those of the antibrachium and the ungual phalanges are described, are compared with those of other Marsupials, and of placental, especially feline, *Carnivora*. An entire lower jaw with the articular condyles adds to the grounds for determination of the habits and affinities of the extinct Marsupial.

Figures of these fossils of the natural size accompany the paper.

Geological Society, May 9.—J. W. Hulke, F.R.S., president, in the chair.—Rev. William Spiers and H. A. Williams were elected Fellows of the Society.—The following communications were read:—The age of the newer gneissic rocks of the Northern Highlands, by Mr. C. Callaway, D.Sc., F.G.S., with notes on the lithology of the specimens collected, by Prof. T. G. Bonney, F.R.S. The object of the author was to prove that the eastern gneiss of the Northern Highlands, usually regarded as

of “Lower Silurian” age, was to be placed in the Archaean. While admitting that this gneiss frequently overlies the quartz-dolomitic group of Erriboll and Assynt, he held that this relation was due to dislocation accompanied by powerful thrust from the east, which had squeezed both formations into a series of folds, thrown over towards the west, so as to cause a general easterly dip. In Assynt the “Upper Quartzite” was first discussed. The author described several sections which he considered to prove that this band was the ordinary quartzite repeated east of a great fault, which brought up the Hebridean; in one place, Glen Coul, the quartzite being conformably succeeded by the brown flags and dolomite. The “igneous rocks” of Nicol (“Logan Rock” of Dr. Heddle) were regarded as the old gneiss brought up by a fault and thrown over on to the Assynt group to the maximum breadth of more than a mile. The “Upper Li nestone” of authors was described as either outliers of the dolomite or a part of the Caledonian series. The “Caledonian” rocks were seen in Glen Coul to be immediately overlying the Hebridean, the Assynt group being caught in the angle between the two gneisses, and bent back in overthrown folds. The mountain groups of Assynt were described as usually consisting of cores of Hebridean gneiss swathed in or capped by sheets of quartzite. In the former case the quartzite on the western slopes was contorted into overthrown folds by the thrust from the east. In the Loch Erriboll district, the “granulite” of Nicol was considered to be a lower division of the Caledonian gneiss, though bearing some resemblances to the Hebridean. In other respects the views of Nicol were regarded as substantially correct. Along the entire length of Loch Erriboll, a distance of about twelve miles, the thrust from the east had bent back the Assynt group into overthrown folds, and pushed the Caledonian gneiss on the top of the inverted quartzite. This had produced the appearance of an “upper” quartzite passing “conformably” below the eastern gneiss. The superior antiquity of the Caledonian was confirmed by the occurrence of outliers of quartzite upon the Arnaboll (Lower Caledonian) series, and by the fact that the granite, which sent numberless veins into the gneiss, never penetrated the quartzite and associated rocks.—On a group of minerals from Lilleshall, Salop, by C. J. Woodward, B.Sc., F.G.S.—Fossil Chiloglomeratus Bryozoa from Muddy Creek, Victoria, by A. W. Waters, F.G.S.

Chemical Society, May 17.—Dr. W. H. Perkin, president, in the chair.—Capt. W. de W. Abney, F.R.S., delivered a lecture on photographic action studied spectroscopically. The lecturer said he wished that all chemists were photographers; photography occupied the borderland between chemistry and physics; he was firmly convinced that photographic action was interatomic. The action of a developer was then experimentally illustrated; this action is physical. Light causes the liberation of iodine in a film of silver iodide, and the developer precipitates metallic silver. The silver so reduced is infinitesimal, and must be in many cases derived from the film. The positive pole of the electric arc was found to be the best source of light. Gratings could not be used for quantitative work, as they varied so much in their ruling; a glass prism was therefore used to form the spectrum. A film of silver chloride absorbs only the violet end of the spectrum; silver iodide absorbs more, and the bromide most of all; accordingly when a photograph of the spectrum was taken on these three films it was seen that the portion of the chloride acted upon was very much less than when bromide of silver was used. It was shown that a sensitizer essentially takes up the halogen liberated by the action of light. One salt of silver may act as a sensitizer to another salt of silver. Photographic action is completely prevented by the presence of oxidisers, as bichromate, &c. Reverse photographs were discussed, and the action of sodium sulphite in preventing the evil effects of over exposure. The peculiar green condition of silver bromide which is sensitive to ultra-red rays was explained. In conclusion the lecturer said that his principal object was to warn chemists of some of the numerous pitfalls which they might encounter in scientific photography.

Meteorological Society, May 16.—Mr. J. K. Laughton, F.R.A.S., president, in the chair.—F. A. Bellamy, T. A. Mercer, Rev. H. J. Poole, and A. Wise, M.D., were elected Fellows of the Society. The following papers were read:—Composite portraiture adapted to the reduction of meteorological and other similar observations, by G. M. Whipple, B.Sc., F.R.A.S. It has often been remarked that one of the main,